

Digital Humans: What Roles Will They Play?

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Panelist

Nadia Magenat-
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MIRALab, University
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Panelist

Laurie McCulloch
Digital Animation
Group
Panelist

Evan Marc Hirsch
Electronic Arts
Panelist

Phil LoPiccolo
Computer Graphics
World
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1. Introduction

Computer graphics technology has progressed to the point where it is possible to create digital humans that are virtually indistinguishable from the real items. The potential benefits are immense, but there are implications to consider as well, in a range of applications that includes film, video, the Web, and gaming. This panel of experts from diverse disciplines of computer graphics will discuss how far we have come in the use of digital humans, where they are heading, and what they will mean to us.

1.1. Questions

What are the positive ramifications of digital humans in your field?

What are some of the controversial aspects of the technology?

Which applications or examples represent state-of-the-art digital humans in your area of computer graphics? Where is state of the art headed?

How can common technologies in the various fields in which digital humans are used be applied for different purposes? Put another way, how might technology transfer occur?

2. Norman I. Badler, panelist

What will virtual humans be like in 100 years? Will there be any difference? No. This may be the last generation that sees a difference between real and virtual things. Will digital humans decide whether to do our bidding or will they be our new slaves? Will they demand emancipation? Will they be an outlet for our baser drives or desensitize us to them (games and violence; sex and pornography—cause-and-effect relationships?). Do they accommodate to us or do we accommodate to them? Will they need beliefs and axioms (dogma)? Will we be their gods?

2.1 Badler bio

Norman I. Badler is a Professor of Computer and Information Science at the University of Pennsylvania, and is Associate Dean for Academic Affairs in the School of Engineering and Applied Science. Active in computer graphics since 1968 with more than 200 technical papers, his research focuses on human figure modeling, manipulation, and animation control in real-time 3D graphics. Badler's current research interests include animation via simulation, embodied agent software, human-computer interfaces, and computational connections between language and action. Badler received a Ph.D. in Computer Science in 1975 from the University of Toronto. He is Co-Editor of the journal *Graphical Models*. Badler also directs the Center for Human Modeling and Simulation. Among the Center's achievements are the human modeling software system "Jack" that was the basis for a spin-off company in 1996 (Transom Technologies, bought by Engineering Animation, and now a part of EDS). Badler has been active in SIGGRAPH since 1976, being Conferences Tutorial Chair in the late 1970s and national Vice Chair from 1978 to 1981.

3. Nadia Magnenat-Thalmann, panelist

Since the time we simulated Marilyn Monroe and Humphrey Bogart in the well-known film "Rendez-vous in Montreal" in 1987, featuring for the first time two legendary stars, more and more virtual humans have been created that showed a more realistic appearance. They also have more natural functions, such as showing emotions, walking, talking, etc. What is the next step? First of all, virtual humans should not be made mainly by hand, i.e. with a lot of real human designer interaction. They should be modeled more automatically and above all possess knowledge themselves. They should know how to behave in any circumstance as we real humans do. They should also retain memory, which means knowing who is interacting with them, and then behave accordingly. They should dress themselves, comb their hair, decide on sports activities, and have interactions between each other automatically. This will allow the creation of a virtual world where virtual people are conscious of their environment and can behave, act and react in the proper way without a huge amount of manual work necessary on the part of humans. The applications are endless: We will be able to simulate any situation before it is created for real, such as in manufacturing or cultural heritage. Digital humans will interact with us on all topics and explain to us, with real-time simulations, what could happen in a given event. Also, an area where they will take an increasing role is the medical field. We will simulate internal individual organs with biomechanical models and we will soon be able to be operated on, on our own virtual reconstructed human model before any surgery is performed on our real body. When real surgery is performed, it will be done mainly with the help of 3D real-time organ reconstruction and deformation. This will allow a more precise knowledge of individual bodies and provide better results and a chance to live longer and in better shape. In the long run, real humans will have more and more prosthetic devices—chips to increase the duration and quality of life. On their side, the virtual humans, functioning with chips, will move slowly to biological hardware. The difference in nature between the virtual and real humans will decrease slowly. Fantasy or reality? Only the future can provide the answer.

3.1 Magnenat-Thalmann bio

Professor Nadia Magnenat-Thalmann has pioneered research into virtual humans over the last 20 years, participating in and demonstrating some of the most spectacular state-of-the-art developments in the field, and is responsible for the rigorous and intensive academic research programs that made them possible. Nadia Magenat Thalmann studied at the University of Geneva and obtained several bachelor degrees, including Psychology, Biology, and Computer Science. She received a MS in Biochemistry in 1972 and a PhD in Quantum Physics in 1977. From 1977 to 1989, she was a Professor at the University of Montreal in Canada. In 1989, she founded MIRALab, an interdisciplinary creative research laboratory at the University of Geneva. She has received several scientific and artistic awards for her work on virtual humans in Canada and in Europe. Author and coauthor of more than 200 research papers, she has directed and produced several films and mixed real-time reality shows, and created Virtual Marilyn Monroe for the film "Rendez-vous in Montreal" in 1987. She is

editor-in-chief of the Visual Computer Journal published by Springer Verlag and co-editor-in-chief of the Journal of Visualisation and Computer Animation published by John Wiley (www.miralab.unige.ch).

4. Laurie McCulloch, panelist

Ananova marked a milestone in interactive digital humans, but many others are gaining notoriety as well, including a digital William Shakespeare (who hosted BBC comedy programs), Head (a virtual talk-show host), and VIA (a range of Virtual Interactive Assistants). The trend has been to endow virtual characters with intelligence to enable them to interact more naturally with humans, thus heralding new and potentially limitless roles for digital characters.

4.1 McCulloch bio

Laurie McCulloch is development director of Digital Animation Group, developers of virtual human characters that range from newscasters and avatars to actors and models. The most famous of these is Ananova, a 28-year-old, green-haired, digital character who delivers news over the Web.

5. Evan Marc Hirsch, panelist

For better or for worse, the games industry has been working with “Virtual Humans,” or more specifically AI controlled characters, for more than 10 years. With the advent of 32-bit consoles, games began to rely less on the user’s imagination and more on the team of programmers and artists for how digital humans were portrayed. Now, the next generation consoles have arrived, and the challenges have increased exponentially. We may have more power and RAM to push more polygons and detail, but the real challenge for developers is creating non-linear characters that have depth and personality. This has had fascinating and frustrating implications for the gaming business.

5.1 Hirsch bio

Evan Marc Hirsch is Head of Visual Development for Electronic Arts Worldwide Studios and is responsible for developing interactive content for next-generation gaming consoles. Over the last year, he worked directly in Art Direction and Technical Art Direction capacity on two titles currently in production. Prior to that he was Head of Visual Development for Electronic Arts Europe, where he responsible for visuals and graphics on PS2 Launch titles. From 1996 to 1999, he served as Manager, Motion Capture, Electronic Arts Canada; where he was responsible for all motion capture requirements from pre-production to finished product for more than 25 games and supervised motion capture on 10 titles that each sold over 1 million units. He delivered a speech at the Belgium Film and Animation Festival entitled “Bringing Life Into Video Games,” which focused on the challenges and the techniques for developing characters that have depth and personality in real time games.

6. Phil LoPiccolo, moderator

6.1 LoPiccolo bio

Phil LoPiccolo is Editor-in-Chief of Computer Graphics World magazine, a position he has held for eight years. Prior to working at CGW, he served as Senior Editor of MIT’s Technology Review magazine, Managing Editor of McGraw-Hill’s Popular Computing magazine, and Executive Editor of the New England Journal of Medicine’s Massachusetts Medicine magazine. He holds an MS in Science Journalism from Boston University and a BS in Engineering from the University of Michigan.